

AMENDMENTS TO THE CLAIMS

Claims 1-9 (Cancelled)

10. (Currently Amended) A method for forming a semiconductor device, the method comprising:

forming a first dielectric layer;

forming a first gate on the first dielectric layer;

forming ~~at least a portion of~~ a second dielectric layer on the first gate; ~~and then~~

forming a silicon nitride film on the second dielectric layer; and then

forming a first nitrogen-rich region within the first gate and substantially adjacent to the first dielectric layer, and a second nitrogen-rich region within the first gate and substantially adjacent the second dielectric layer, wherein

~~the at least a portion of the second dielectric layer is formed on the first gate prior to forming, within the first gate, either the first nitrogen-rich region and/or the second nitrogen-rich region~~

the silicon nitride film is formed on the second dielectric layer prior to the step of forming the first nitrogen-rich region and the second nitrogen-rich region within the first gate.

11. (Currently Amended) A method for forming a semiconductor device, the method comprising:

forming a first dielectric layer;

forming a first gate on the first dielectric layer;

forming a second dielectric layer on the first gate; and then  
forming a first nitrogen-rich region within the first gate and substantially adjacent to the first dielectric layer, and a second nitrogen-rich region within the first gate and substantially adjacent the second dielectric layer, wherein the step of forming the first nitrogen-rich region and the second nitrogen-rich region within the first gate further comprises:

implanting nitrogen ions through the second dielectric layer and into the first gate, the implanted nitrogen ions forming a first nitrogen concentration profile within the first layer gate; and

causing the first nitrogen concentration profile to be altered to form a second nitrogen concentration profile within the first gate, the second nitrogen concentration profile comprising the first nitrogen-rich region, the second nitrogen-rich region and a contiguous reduced-nitrogen region located between the first nitrogen-rich region and the second nitrogen-rich region, the contiguous reduced-nitrogen region having a lower concentration of nitrogen than the first nitrogen-rich region and the second nitrogen-rich region.

12. (Original) The method as recited in Claim 11, wherein the step of causing the first nitrogen concentration profile to be altered further comprises causing the first nitrogen-rich region to include between about 0.01% and about 1% atomic percentage of nitrogen.

13. (Original) The method as recited in Claim 12, wherein the step of causing the first nitrogen concentration profile to be altered further comprises causing the second nitrogen-rich region to include between about 0.01% and about 1% atomic percentage of nitrogen.

14. (Original) The method as recited in Claim 11, wherein the step of causing the first nitrogen concentration profile to be altered to form the second nitrogen concentration profile within the first gate further comprises causing the lower concentration of nitrogen in the contiguous reduced-nitrogen region to include less than about 0.001% atomic percentage of nitrogen.

15. (Currently Amended) The method as recited in Claim 10, wherein the step of forming ~~at least a portion of~~ a second dielectric layer on the first gate includes forming a first silicon dioxide film on the first gate.

16. (Currently Amended) The method as recited in Claim 15, wherein the step of forming ~~at least a portion of~~ a second dielectric layer on the first gate further includes forming a silicon nitride film on the first silicon dioxide film prior to the step of forming the first nitrogen-rich region and the second nitrogen-rich region within the first gate.

17. (Currently Amended) The method as recited in Claim 16, wherein the step of forming ~~at least a portion of~~ a second dielectric layer on the first gate further includes forming a second silicon dioxide film on the ~~first silicon dioxide~~ silicon nitride film prior to the step of the step of forming the first nitrogen-rich region and the second nitrogen-rich region within the first gate.

18. (Currently Amended) The method as recited in Claim 11, wherein the step of implanting nitrogen ions through the second dielectric layer and into the first gate uses an ion implantation energy of between about 10 and about 30 KeV to provide a dosage of between about  $1 \times 10^{14}$   $10^{14}$  and about  $1 \times 10^{16}$   $10^{16}$  nitrogen ions/cm<sup>2</sup>.

19. (Original) The method as recited in Claim 11, wherein the step of causing the first nitrogen concentration profile to be altered to form a second nitrogen concentration profile within the first gate further includes applying thermal energy to the first gate.

20. (Original) The method as recited in Claim 19, wherein the step of applying thermal energy to the first gate causes an internal temperature within the first gate of between about 900 and about 1100 C°.

21. (Original) A method for nitrogen doping a polysilicon layer, the method comprising:  
forming a polysilicon layer in a semiconductor device, the polysilicon layer sharing a first interface with an underlying dielectric layer and a second interface with an overlying dielectric layer;

implanting nitrogen through the overlying dielectric layer and substantially into a polysilicon layer; and

heating the polysilicon layer to cause the implanted nitrogen to form a first nitrogen-rich region substantially adjacent to the underlying dielectric layer and a substantially separate second nitrogen-rich region substantially adjacent the overlying dielectric layer, thereby leaving a reduced-nitrogen region located within the polysilicon layer between the first nitrogen-rich

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region and the second nitrogen-rich region, wherein the reduced-nitrogen region always has a lower concentration of nitrogen than the first nitrogen-rich region and the second nitrogen-rich region.

Claims 22-26 (Cancelled)